Draft ENVIRONMENTAL ASSESSMENT

USDA Forest Service

Pine Creek Restoration Project

Eagle Lake Ranger District, Lassen National Forest

Lassen County, California

Introduction

The Pine Creek Restoration Project proposal stems from an evaluation of opportunities to increase the resiliency and overall function of the Eagle watershed by improving water quality and quantity, timing and duration of flows, and stream and riparian condition. As a result of the evaluation, the Eagle Lake Ranger District (ELRD) of Lassen National Forest (LNF) is proposing actions focused on decommissioned and unauthorized roads and railroad grades, diversions, and dug-out waterholes on Pine Creek and tributaries to improve watershed function and address many areas of degraded aquatic and riparian habitat.

The Pine Creek Restoration Project will be implemented under the pre-decisional objection process found at 36 CFR 218. Under this collaborative process public concerns can be addressed before a decision is made increasing the likelihood of resolving any concerns and making better, more informed decisions.

Differences to the proposed action for clarification or additional specificity are disclosed in this document and changes are written in *italics*. See page 18 of the Environmental Consequences section of this Environmental Assessment (EA) for a list of specialist's reports incorporated by reference for the Pine Creek Restoration EA.

Project Area

The projects occur in three areas along Pine Creek and associated tributaries within the Eagle watershed: Upper Pine Creek Valley, Lower Pine Creek Valley, and Burgess Meadow. Project work will occur over approximately 55 acres total in these three areas. Upper and Lower Pine Creek Valley are within the Campbell (MA 23) Management Area and Burgess Meadow is within the Harvey (MA 12) Management Area, as identified in the LNF Land Resource Management Plan (LRMP). The project areas are roughly 24 air miles northwest of Susanville, Lassen County, California, just east and southeast of the Blacks Mountain Experimental Forest. Included are portions of Township (T) 31 North (N), Range (R) 8 East (E), Sections (S) 1-4 and 11; T32N, R9E, S16, 29, 31-32; T33N, R8E, S36; and T33N, R9E, S31 of the Mount Diablo Meridian (Figure 1).

The Eagle watershed is a significant drainage basin on the Eagle Lake Ranger District (ELRD) located within the 4th field Honey-Eagle Lakes sub-basin (HUC[1]: 18080003). It includes Upper Pine Creek

[1] Hydrologic Unit Code (HUC), a commonly-used system for defining drainage boundaries from the US Geological Survey's Watershed Boundary Dataset. Codes describe geographic location and level of the watershed unit.

(1808000301), Middle Pine Creek (1808000302), Lower Pine Creek-Eagle Lake (1808000303) 5th field watersheds, and three of LNF's 6th field priority watersheds identified in 2011 under the US Forest Service's watershed condition classification: Pine Creek Valley-Pine Creek (180800030103), Champs Flat-Pine Creek (180800030204), and Antelope Valley-Pine Creek (180800030301). The Eagle watershed covers 270,000 acres with the majority of it on ELRD (Figure 3). Eagle Lake is in a closed drainage basin with numerous streams providing surface inflows: Pine, Merrill, Little Merrill, Papoose, and Cleghorn creeks. Most are small seasonal streams with the exception of the headwaters of Pine Creek. Pine Creek is the major tributary to Eagle Lake and its watershed comprises over 50 percent of the land area within the basin.

The main channel of Pine Creek is approximately 40 miles in length with a 1,200 ft. elevation gradient change from Leaky Louie's Pond (6,315 ft.) to Eagle Lake (5,100 ft.) Pine Creek is highly variable both seasonally and inter-annually. Pine Creek is perennial from the headwaters near Leaky Louie's spring to McKenzie Cow Camp (approximately 7 miles). The remaining reaches are intermittent and typically flow from mid-March to June depending on the water year. These lower reaches cross a sequence of four much larger, broad, nearly level, alluvial valleys separated by short, relatively steep, volcanic bedrock narrows before entering into Eagle Lake. Pine Creek Valley is the largest valley in the Upper Pine Creek watershed. The valley includes ten miles of Pine Creek flowing in anastomosing[2] channels. The vegetative communities in Pine Creek Valley are characterized by grass and grass-like plants in both wet (*Juncus balticus, Carex nebrascensis)* and dry *(Carex filifolia, Deschampsia cespitosa)* habitats, as wells as brush (*Artemisia tridentata, A. arbuscula, Purshia tridentata, Ericameria bloomeri).*

[2] Anastomosing channels are multithreaded stream channels, but are much more stable than braided channels and commonly have thick clay and silt banks, vegetated islands, and occur at lower stream bed gradients.

Vicinity Map

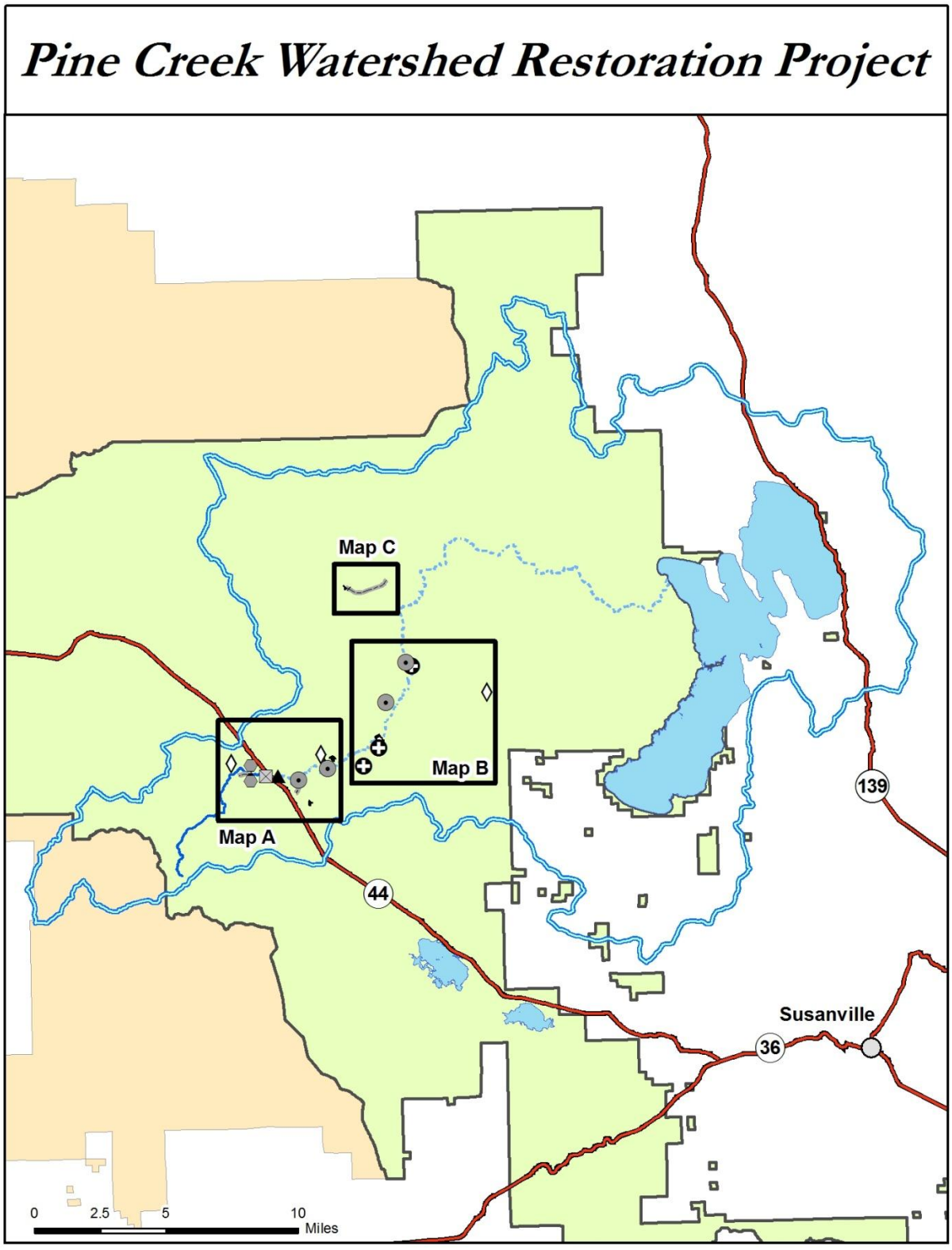

Figure 1. Vicinity map showing project locations.

Maps for Project Areas

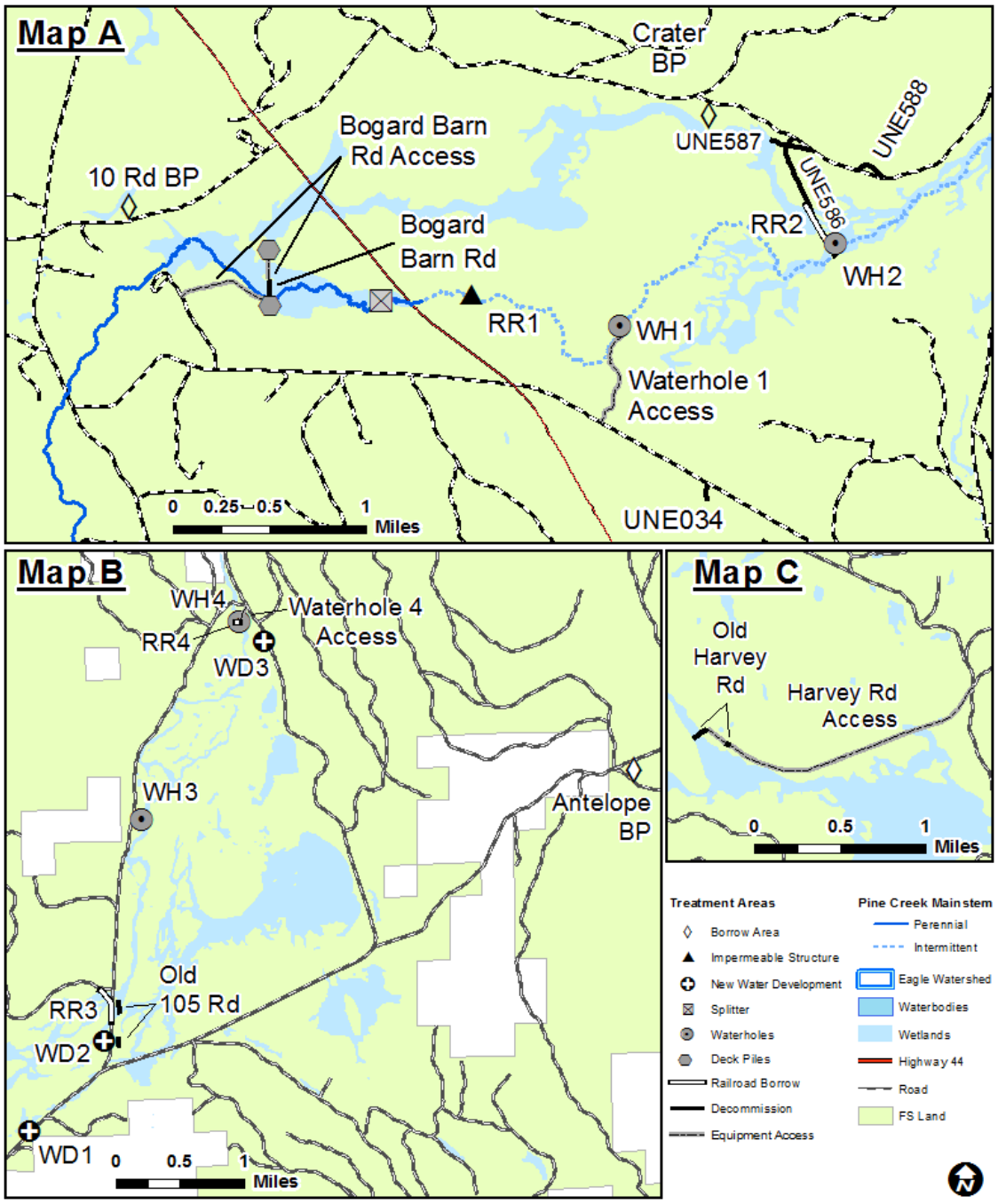

Figure 2. Zoomed-in areas of maps identified in vicinity map showing exact locations of dug-out waterholes, railroads, and roads that were identified to improve watershed function (e.g. hydrologic connectivity and water quality) in Pine Creek Valley and associated tributaries. *(Crater BP is approximately 2100 ft (0.4 mi) from original map location).*

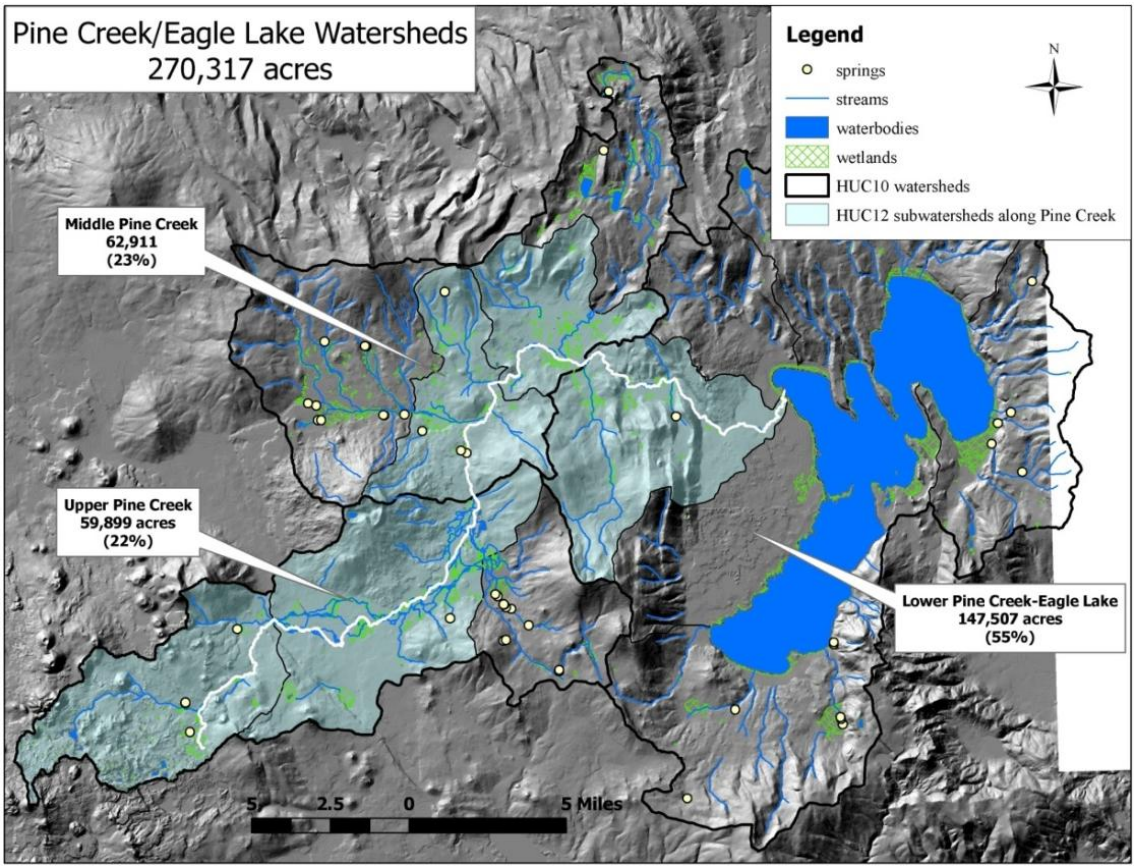

Figure 3. Aerial view of the Eagle watershed (HUC10) and subwatersheds (HUC12).

Purpose and Need

The proposed treatments in the Pine Creek Watershed Restoration Project are based on watershed and range management objectives, as per the LRMP as amended by the Sierra Nevada Plan Amendment (SNFPA). Water and riparian management direction in the LRMP is to maintain or improve riparian-dependent resources in and around wetlands, stream corridors, lakes, seeps, springs, and wet meadows. The LRMP also directs management to provide for long-term rangeland productivity for fisheries, wildlife, soil, water, timber, and livestock forage values. Management objectives focus on distribution of livestock use over rangelands using structural improvements.

The SNFPA management intent for aquatic, riparian and meadow ecosystems include but are not limited to the following:

- maintain and restore the hydrologic connectivity of streams, meadows, wetlands and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths,
- maintain and restore spatial and temporal connectivity for aquatic and riparian species within and between watersheds to provide physically, chemically, and biologically unobstructed movement for their survival, migration, and reproduction,

- maintain and restore the physical structure and condition of stream banks and shorelines to minimize erosion and sustain desired habitat diversity, and
- maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features.

This project is also aligned with both regional and national goals for watershed restoration, including the Region 5 Ecological Restoration Goal to make land and water ecosystems more sustainable, more resilient, and healthier under current and future conditions.

Pine Creek is the primary spawning tributary for the Eagle Lake rainbow trout (ELRT), a subspecies of rainbow trout endemic to the Eagle Lake watershed. The ELRT is under a 12 month review for federal listing due to concerns over its ability to naturally reproduce under current conditions. Portions of its migration and spawning habitat along Pine Creek are degraded as a result of past land management practices that included extensive logging, heavy grazing, stream channelization, and construction of railroads and roads across meadows and streams. Degraded habitat conditions, along with historic commercial fishing and poaching, led to a drastic decline in the population of ELRT by the 1930s. A fish trap and barrier were built near the lake on Pine Creek and ELRT began to be reared entirely in a fish hatchery in the 1950s to prevent possible extinction. Efforts to restore natural spawning started in the late 1990s with improvements to aquatic passage. Although most fish passage concerns have been addressed by collaborative restoration efforts in the past two decades, there is still a need to improve watershed function to enhance the aquatic and riparian habitat along many reaches of Pine Creek to increase the chances of successful re-establishment of a wild population of ELRT. Current work on the spawning run indicates that extending duration of flow may help reestablish natural reproduction. This proposal would address many areas of degraded aquatic and riparian habitat and could contribute towards restoring longer flow duration.

The proposed projects are consistent with key watershed issues related to flow characteristics, channel shape and function, and vegetative condition identified in the USDA Forest Service Watershed Condition Framework FY2011. These projects were identified as opportunities to increase the resiliency and overall function of the watershed by improving water quality and quantity, timing and duration of flows, and stream and riparian condition.

Railroads and Roads

Pine Creek's main channel has been affected by construction of roads and railroads. These railroads and roads decrease watershed function by:

1) impeding hydrologic connectivity, especially when they cross valley floors,
2) confining flows to designated crossings, which prevents streams from meandering through the valley bottom, reducing sinuosity and increasing stream power, leading to channel incision. This lowering of the stream bed through the process of channel incision results in less surface flow access to the floodplain during ordinary high flows,

3) re-directing flows and capturing water in borrow ditches, which alters water retention patterns, collectively lowers water table levels and decreases water storage, alters channel morphology and stream flow patterns, and changes vegetative cover and composition.

Sections of abandoned railroads and roads within the floodplain need to be recontoured and the associated borrow ditches filled to allow Pine Creek to migrate across the valley floor, improving hydrologic connectivity and water retention patterns. Additionally, filling in the borrow ditches that hold water would remove the attractants for cattle so they do not concentrate on the stream channel, which should increase the likelihood of meeting riparian and stream channel standards.

The following four railroad grades cross Pine Creek Valley, of which one is active.

Burlington Railroad - Railroad - 1 (T31N, R8E, S3)

The stream channel of Pine Creek on the northeast side of the railroad is higher in elevation than the borrow ditch allowing water to flow into the borrow ditches. As stream flows decrease, water recedes and becomes trapped in the borrow ditches. An impermeable berm is needed to prevent water from flowing down the borrow ditch where it is subjected to high evaporative losses.

Abandoned Railroad - 2 (T31N, R8E, S1)

Abandoned railroad 2, downstream of the Burlington railroad, extends across Pine Creek Valley with a narrow cut-out where Pine Creek crosses. The railroad grade within the floodplain needs to be recontoured and associated borrow ditches filled to allow stream sinuosity and improve hydrologic connectivity. Filling in the borrow ditch on the northwest side of the grade would prevent surface flows from moving away from the channel and retaining water following the recession of spring thaw flows. This proposed area is approximately 0.45 mile long and 25 ft. wide.

Abandoned Railroad - 3 (T32N, R9E, S32)

Abandoned railroad 3 is located off of Lassen County Road 105. The elevated railroad grade and associated borrow ditch connect to the 105 road. The abandoned railroad needs to be recontoured within the floodplain to allow stream sinuosity and improve floodplain connectivity. The associated borrow ditch would also need to be filled. This would prevent water from being diverted and stored away from the main channel of Pine Creek, where it provides an attractant for cattle to use as a water source. This railroad impacts an area approximately 0.3 mile long and 35 ft. wide.

Abandoned Railroad - 4 (T32N, R9E, S16)

Abandoned railroad 4 crosses Pine Creek Valley where the valley narrows. This railroad grade has a limited effect on channel movement, but the associated borrow ditches divert water from the main channel where is it stored and used by cattle as a waterhole. The borrow ditches need to be filled to remove the livestock attractant from the stream bank. The impacted area is approximately 0.2 mile long and 25 ft. wide.

Bogard Barn Road (Decommissioned Road 31N19) (T31N, R8E, S4)

The Bogard Barn road transects the floodplain of Pine Creek where several braided channels are intersecting the road. Two sections of the road were removed to allow flows to cross, but these crossings are located on secondary channels. The primary channel has no stream crossing through the road bed, and flows from this channel are diverted laterally along the borrow ditch, away from the main channel of Pine Creek. The road bed within the floodplain needs to be recontoured to improve surface and subsurface flow and allow stream sinuosity.

Old 105 Road (T32N, R9E, S32)

The old 105 road is adjacent and east of the active Lassen County Road 105. Several channels cross the previous road bed. The road bed needs to be ripped and recontoured where the stream crossings occur to improve surface flows and allow stream sinuosity.

Harvey Road (T33N, R8E S36 and T33N, R9E, S31)

Burgess Meadow drains to Pine Creek. The Old Harvey Road transects the meadow at the base of Burgess Meadow and then wraps around on the northeast side of the meadow. The section of road transecting Burgess Meadow is an elevated road bed. When this section of the road was decommissioned, notches were cut through the road bed to allow surface flows to cross the road. These notches are channelizing water, causing increased velocity that may be contributing to downstream channel degradation in the meadow south of the road. The elevated road bed within the meadow needs to be recontoured to spread surface flows and improve subsurface flows within the meadow.

An additional section of the Old Harvey Road on the northeast side crosses a seep area flowing into Little Harvey Valley. This section of road is essentially at grade with the meadow, but the compacted road bed is impeding subsurface flow. The road bed needs to be ripped to improve subsurface flows.

Unauthorized Routes

UNE586, UNE587, UNE588, UNE034 are unauthorized routes that are dead-ends or identified as not necessary for our transportation system. These routes are located within or adjacent to Pine Creek Valley. They contribute to sedimentation; and alter surface/subsurface flow interactions; and channel morphology. There is a need to decommission these routes to decrease road density, reduce sediment sources, and improve surface and subsurface flows within the watershed.

Dug-out waterholes

There are two dug-out waterholes located directly on Pine Creek's channel in addition to two waterholes associated with railroad grades 2 and 4. These waterholes decrease hydrologic function on a small localized scale and expose more water to evaporative loss, alter stream channel morphology, and lower the water table, which changes riparian vegetation composition downstream of the waterhole along the stream channel. These waterholes are also a livestock attractant that concentrate cattle at the stream

channel, leading to stream bank degradation and high utilization of riparian vegetation. These waterholes need to be filled and recontoured to decrease evaporative losses, decrease sedimentation and poor local water quality associated with livestock concentrating in the channel, and enhance stream bank stability through improvement in vegetative cover.

Waterhole 1 (T31N, R8E, S2)

Waterhole 1 is located east of Highway 44 in an exclosure and is no longer needed for cattle. This waterhole is 205 feet long by 30 feet wide. The waterhole was created by excavating the stream bed and placing the material in the stream channel on the upstream side. This created a plug that Pine Creek flows around before returning to the channel where the waterhole is located. The plug material needs to be pushed back into the excavated waterhole to improve the surface flow path.

Waterhole 2 (T31N, R8E, S1)

Waterhole 2 is located downstream of abandoned railroad grade 2. This is the largest waterhole in Pine Creek Valley and is 215 feet by 135 feet in size. The dug-out waterhole was built by removing fill from the left stream bank and placing the material on the far side of the waterhole resulting in widening the channel. This waterhole needs to be filled and recontoured to decrease evaporative loss, improve stream bank condition, decrease sedimentation, improve local water quality, and remove a livestock attractant adjacent to the stream channel.

Waterhole 3 (T32N, R9E, S29)

Waterhole 3 is located approximately one mile downstream from the upper 105 road crossing and is 130 feet by 135 feet in size. The waterhole was built by excavating the channel bottom and placing the material on either side of the stream channel. This waterhole needs to be filled and recontoured to decrease evaporative loss, improve stream bank condition, decrease sedimentation, improve local water quality, and remove a livestock attractant located on the stream channel.

Waterhole 4 (T32N, R9E, S16)

Waterhole 4 is located on the north side of abandoned railroad grade 4 and is 175 feet by 115 feet in size. The borrow ditch on the same side of the abandoned railroad grade was excavated to extend exposure of water for cattle in the late season. This waterhole needs to be filled and recontoured to decrease evaporative loss, improve stream bank condition, decrease sedimentation, improve local water quality, and remove a livestock attractant adjacent to the stream channel.

Replacement Waterholes

In order to maintain grazing in active allotments, three waterholes are needed to replace the four waterholes that are proposed to be removed as well as the water held along the borrow ditch associated with railroad 3. Two waterholes are needed in the Upper Pine Creek Valley Allotment and one waterhole

is needed in the Lower Pine Creek Valley Allotment. Waterholes are a livestock attractant and the replacement waterholes would be located away from the stream channel to improve livestock distribution and reduce stream bank instability, utilization, and bank alteration.

Check Dam/Splitter

In the 1950s, a ditch, referred to as the "super ditch", was built on the east side of Highway 44 from Pine Creek to direct all flows into a single channel to cross Highway 44 and the active railroad. In 1999 a check dam and splitter were built at the beginning of the super ditch on the west side of Highway 44 to redirect partial flows from the super ditch to one of the original channels of Pine Creek to restore the natural hydrology in this section of Pine Creek. This design was used to control the amount of water going into the original channel until riparian vegetation recovered and the functional condition of the channel could receive increased flows without negative effects. Monitoring has demonstrated that rhizomatous vegetation has recovered to approximately 50 percent aerial cover and can receive increased flows. Therefore, a new structure is needed that would divert all but flood event flows into the original channel. This would allow the restored channel to develop better channel morphology and increase water efficiency along Pine Creek because surface flows would not be spread across two areas.

Borrow Pits

Additional material is needed to recontour and fill abandoned borrow ditches adjacent to railroad grades, roads, and dug-out waterholes. Approximately thirty percent of the on-site material used to create the abandoned railroad grades, roads, and waterholes has been lost through time via wind and water erosion. This material would be excavated from *two* existing and *one new* borrow areas on the forest to provide additional fill. These borrow areas would provide local soil and also would reduce the haul length and associated transportation cost to implement the proposed actions.

Fencing

The restoration improvement sites are located within active allotments. Following implementation, these sites would be disturbed and bare soil would be exposed. If monitoring indicates, temporary fencing or rest would be needed to protect the disturbed areas from livestock grazing until vegetation recolonizes the area and the sites are stable.

Alternatives

Alternative 1: Proposed Action

Railroads and Roads

Railroad 1

Along the Burlington railroad (Railroad 1), an impermeable mound of rock and soil would be placed on an existing rock barrier on the northeast side of the railroad, northeast of the box culverts. The impermeable mound would prevent the diversion of water from Pine Creek into the borrow ditch, which occurs due to the streambed being higher in elevation on the downstream side of the railroad grade. Mechanical equipment would be used to transport fill and create the impermeable mound. Access to this location would be along the utility road adjacent to and east of the railroad. This would reduce evaporative losses and increase the volume of water that gets transported downstream. Because this is an active railroad, the ditch would be retained to allow for overflow during flood events.

Railroad 2 and 3

The abandoned railroad grades 2 and 3 would be recontoured and the associated borrow ditches filled within the floodplain of Pine Creek Valley. This would reduce flow barriers, restore natural surface water flow paths, decrease evaporative losses, and increase water storage leading to longer duration base flows. Material from the railroad grade and additional fill from the nearby borrow pits would be used. Mechanical equipment would be used to recontour the railroad grades and transport fill. UNE586 would be used by equipment to access the project areas for railroad 2 and the existing railroad grade would be used to access the project location for railroad 3. Protective cover would be placed on the disturbed area along the stream channel and bed to protect the stream channel from erosion until it stabilizes with riparian vegetation.

Railroad 4

Railroad 4 is located where Pine Creek Valley is narrowing and does not negatively influence hydrologic function. However, the associated borrow ditches hold water and cattle utilize these ditches as a watering hole. A section of the railroad grade on the west side of Pine Creek would be recontoured using mechanical equipment to fill the borrow ditches on both sides of the grade to prevent water from being held and used for watering by livestock. An existing access route would be used to access railroad 4 from 33N07.

Bogard Barn Road

Approximately 0.11 mile of the decommissioned Bogard Barn road located within the floodplain of Pine Creek would be recontoured and the adjacent borrow ditches would be filled with on-site material from the decommissioned road fill as well as additional fill. Mechanical equipment would be used to recontour

the road bed and transport fill. 31N19 would be used to access this area. Stream crossings would be recontoured to grade and the bank on the middle stream crossing would be sloped back. Trees that have grown on the elevated road bed would be removed using an excavator, so that the entire tree is removed (bole, stump, and roots), and piled in designated locations. This material would be sold, chipped, and/or burned.

Old 105 Road

Sections of the Old 105 road, (parallel and east of 32N28Y), totaling approximately 0.19 mile, would be ripped and recontoured to grade using mechanical equipment to improve surface and subsurface flow. Mechanical equipment would access the southern section using the Old 105 road from 32N28Y. A short access route would be used to access the northern section by crossing a sagebrush flat from 32N28Y. Protective cover would be used if needed, and/or mulch and seeded with native vegetation to stabilize the soil.

Old Harvey Road

Approximately 0.10 mile of the Old Harvey Valley Road crossing Burgess Meadow would be recontoured to grade with existing road fill as well as additional fill to reduce channelization and improve sub-surface flow. In the area where a seep is crossing the Old Harvey Valley Road, approximately 0.035 mile of road would be ripped to improve subsurface flow. The Old Harvey Road would be used to access this area from 33N47. Protective cover would be used if needed, and/or mulch and seeded with native vegetation to stabilize the soil.

Unauthorized Routes

UNE586, UNE587, UNE588, UNE034 are unauthorized routes in Pine Creek Valley totaling 1.2 miles in length. These roads would be decommissioned by ripping and/or recontouring to reduce potential sediment sources and overall road density in the Upper Pine Creek watershed.

Dug-out waterholes

Waterhole 1, 2, 3, and 4

The four waterholes would be filled and recontoured to match the natural channel morphology immediately upstream and downstream at each site. The on-site fill material that was removed to create the waterholes as well as additional fill would be used. Mechanical equipment would be used to recontour the waterholes and transport fill. Protective cover would be used to prevent erosion along the stream channel before vegetation stabilizes the area. Native vegetation would be seeded and mulched if the disturbed areas do not naturally re-vegetate.

An access route was designated from 31N06 along the sagebrush flat to waterhole 1. Tracked equipment would be used to recontour the existing waterhole. No additional fill is needed for this waterhole. The

same access route for railroad 2 (UNE586) and 4 would be used to access waterhole 2 and 4 respectively. Access to waterhole 3 would be 0.04 mile across a sagebrush flat from 32N28Y.

Replacement Waterholes

The replacement waterholes would be developed prior to closing and restoring the dug-out waterholes. *Total size of all replacement waterholes would not exceed 1.5 acres*. In the Upper Pine Creek Allotment two water developments are needed. The replacement location for water development 1 would be located adjacent to the 21 road, and water development 2 would be located on an existing borrow ditch along 32N28Y. These borrow ditch areas would be further excavated *but each would not exceed 0.5 acres* using mechanical equipment to extend water exposure throughout the grazing season. If needed, a solar pump would be used to pump water from water development 1 to a trough to control the timing of water use to improve livestock distribution. In the Lower Pine Creek Allotment, replacement waterhole 3 would be located near 32N02 on the existing borrow ditch on the southeast side of railroad 4, 0.07 mile from waterhole 4. This borrow ditch would be excavated *but would not exceed 0.4* acres using mechanical equipment to extend water exposure throughout the grazing season to replace waterhole 4.

Check Dam /Splitter

An in-stream *impermeable* structure *made out of rock and soil* would be built to replace the *current rock* splitter at the existing location. This new structure would direct all but flood event flows into the original restored channel. The super ditch would be maintained as an overflow channel during flood events to protect the existing highway and active railroad infrastructure. *Rock and soil would be transported using mechanized equipment on the berm adjacent to the super ditch to the splitter location.*

Borrow Pits

Fill would be taken from two existing borrow pits and one new borrow pit on the District. Approximately 10,000 cubic yards of fill would be excavated from the 10 Road borrow pit to provide fill for the proposed Bogard Barn Road area. Approximately 15,000 cubic yards of fill would be excavated from the Crater borrow pit to provide fill for the proposed railroad grade 2 and waterhole 2. Approximately 10,000 cubic yards of fill would be excavated from the Antelope borrow pit to provide fill for the proposed areas for waterhole 3 and 4 and the borrow ditches at Railroad 4.

All trees occurring in the Crater borrow pit would be removed so that the entire tree (bole, stump, and roots) would be removed and piled in designated locations. This material would be sold, chipped, and/or burned.

Fencing

Treatments that occur within active allotments would be monitored to ensure that grazing does not impede recolonizing vegetation or cause damage to the restored site. If monitoring indicates that protection is needed, temporary fencing or rest would be implemented until the treatment area is stable.

Integrated Design Features

The following are the integrated design features (IDF) that would be incorporated as part of the proposed action to minimize any possible negative effects of this proposal.

Cultural Resources

1. All historic properties eligible or potentially eligible for listing on the National Register of Historic Places (i.e., Class I and Class II properties) within treatment areas would be protected by employing Standard Resource Protection Measures (SRPM) as defined in the Regional Programmatic Agreement and Interim Protocol. Cultural site boundaries would be flagged as non-entry zones for project activities (flag and avoid).
2. If cultural resources are encountered during project activities, all work would immediately stop in the vicinity of the find until an assessment of the situation is made.
3. To avoid any subsurface disturbance, no decommissioning of roads via ripping is allowed through sites; ripping is allowed on road segments not within sites. Decommissioning of roads could also be achieved through placement of barriers, as long as they are not ground disturbing and outside site boundaries.
4. *Waterholes would be located outside of historic properties.*
5. *If fencing is needed, it would be located outside of historic properties.*

Noxious Weeds

6. All off-road equipment would be weed-free prior to entering the Forest. Staging of equipment would be done in weed-free areas.
7. Known noxious weed infestations would be identified, flagged where possible, and mapped for this project. Identified noxious weed sites within or adjacent to the project area containing isolated patches with small plant numbers would be treated (hand pulled or dug) prior to project implementation. Any larger or unpullable infestations would be avoided by equipment to prevent spreading weeds within the project.
8. New small infestations identified during project implementation would be evaluated and treated according to the species present and project constraints and avoided by project activities. If larger infestations were identified after implementation, they would be isolated and avoided by equipment, or equipment used would be washed after leaving the infested area and before entering an uninfested area.
9. Post-project monitoring for implementation and effectiveness of weed treatments and control of new infestations would be conducted as soon as possible and for a period of two years after completion of the project.

10. *If project implementation calls for mulches or fill, the source site would be surveyed beforehand and the material used only if it is determined to be weed-free. Seed mixes used for revegetation of disturbed sites would consist of locally adapted native plant materials to the extent practicable.*

Riparian Conservation Areas and Water Quality Protection Measures

11. *In-channel work will occur when most streams have ceased flowing, with the potential exception of Pine Creek at the Bogard Barn Road site. If needed, the stream will be dewatered for a section of approximately 150 feet within the restoration site only while work is taking place. Coffer dams and pumps would be used to temporarily divert water around the site until work has been completed. The diversion would be removed after completion of site work and flows would be returned to the stream gradually to prevent excessive scour.*

12. *If dewatering is needed, native fish would be captured and relocated to suitable perennial habitat in Pine Creek. These actions would be coordinated between the Forest Service and the California Department of Fish and Wildlife.*

13. *If dewatering is needed, no in-channel work would be implemented if redds are present from the active railroad grade and upstream of the Bogard Barn until fry fully emerge or failure of redds is confirmed.*

14. Soils will be dry at the 12-in. (15-bars of tension) depth along the temporary access routes that are not restoration project sites.

15. Equipment will cross stream channels when the streams are dry and at designated locations.

16. *After work is completed, bare, recently-disturbed soils will be covered with coconut coir mats, weed-free straw or similar appropriate material to provide ground cover while vegetation is re-establishing.*

17. *Where available and feasible, sedge plugs or mats from existing on-site vegetation will be planted to facilitate recovery.*

18. *If banks need stabilization, rock armoring would be used for the sides and bottom of channels where in-channel waterholes are recontoured to prevent erosion.*

19. *Where fill is needed, imported fill would be used as the base fill and top soil that was conserved during construction would be applied on top.*

Threatened, Endangered, or Sensitive (TES) Plant Species

20. New occurrences of TES plant species discovered before or during ground-disturbing activities would be protected through flag-and-avoid methods.

21. Decommissioning of roads would avoid *all* occurrences of *Astragalus pulsiferae* var. *suksdorfii* to the extent practicable

22. No staging, parking, or blading will be done within any occurrence of *Astragalus pulsiferae var. suksdorfii*, nor will any fill be deposited in any of these occurrences.

Fuels

23. *Non-merchantable trees that occur on restoration sites, associated borrow ditches, and access routes would be removed and material would be lopped and scattered.*
24. *Fire lines would be constructed for pile burning operations, except where existing roads, skid trails, or natural barriers would serve as control lines.*

Alternative 2: No Action

Under the No Action alternative, the current LRMP, as amended, would continue to guide management within the project area. No actions would be initiated for improved watershed function and existing unauthorized routes and abandoned railroad grades would remain on the landscape. Existing dugout waterholes would remain in-stream. Current management practices such as road maintenance and fire suppression would continue.

Public Involvement

The following list outlines the public involvement process for the Pine Creek Restoration Project:

- The project has been listed in the Lassen National Forest Schedule of Proposed Actions (SOPA) since July 1, 2013.
- The project proposal was discussed with the Pine Creek Coordinated Resources Management Group on September 9, 2013.
- The project proposal was discussed with the range permittees from the area in November 2013.
- The project proposal was discussed with the Lahontan Water Quality Control Board in January 2014.

Scoping

Scoping for this project was initiated on November 1, 2013. Individuals and groups that expressed interest in response to the SOPA were mailed a copy of the scoping document for this project. One individual/organization responded in writing. There were no issues or alternatives suggested from the public.

Decision to be Made

The decision to be made is whether to implement Alternative 1, the Proposed Action, as described above, as modified to address any public comment issues or whether to continue management with Alternative 2, the No Action Alternative.

Environmental Consequences

This section describes the environmental impacts of the alternatives in relation to whether there may be significant environmental effects as described in 40 CFR 1508.27. The following documents are summarized in this EA and are available upon request and are hereby incorporated by reference into this assessment:

- Management Indicator Species Report, Pine Creek Restoration Project; Rickman and Vandersall, (MIS Report)
- Biological Evaluation for the Pine Creek Restoration Project; Rickman (Terrestrial) and Vandersall (Aquatic), (BE)
- Pine Creek Restoration Project, Range Report; Pasero, (Range Report)
- Biological Evaluation and Assessment for R5 Forest Service Sensitive and Federally Listed Plant Species, Pine Creek Restoration Project; Lepley and Sanger, (Botany BE/BA)
- Pine Creek Restoration Project, Hydrology and Soils Report; Blaschak, (Hydrology Report)
- Cultural Resources Report, Pine Creek Restoration Project; Gudiño, (Cultural Report)
- Pine Creek Restoration Project, Transportation Report; Nagel, (Transportation Report)
- Noxious Weed Risk Assessment; Lepley and Sanger, (Noxious Weed Risk Assessment)
- Pine Creek Restoration Project, Fuels; Chuck Lewis (Letter to the file)
- Pine Creek Restoration Project, Recreation; KC Pasero (Letter to the file)

Further analysis and conclusions about the potential effects are available in the above reports and other supporting documentation located in the project record. The following sections are discussions of resources that have relevance to a determination of significance. The cumulative effects boundary for was defined by each resource.

Hydrology and Soils

Alternative 1

Direct and Indirect Effects

The watershed improvements proposed under this alternative are in or near seasonal streams, meadows, or wet meadows and would require ground disturbing activities. The proposed action includes decommissioning and recontouring four waterholes in Pine Creek Valley, developing three off-channel livestock water sources, developing a new borrow pit, ripping and recontouring 1.2 miles of unauthorized routes, ripping and/or recontouring 1 mile total of previously decommissioned roads and abandoned railroad grades, and blocking borrow ditches adjacent to Pine Creek. A direct effect of these proposed activities would be a potential short-term increase in sedimentation for work done within or immediately adjacent to intermittent channels. This work would be done when most streams are not flowing, though

depending on the water year some base flows in Pine Creek may reach the Bogard Barn Road, and a short section within the work site would be dewatered if this is the case. The proposed action includes activities that would reduce soil cover in some areas, most notably where recontouring of waterholes, abandoned railroads, and unauthorized transportation routes occur. These cover impacts would generally be short-term as soil cover is replenished by low-growing plants, and long-term cover would improve with reduced concentration of cattle in riparian areas. Project Integrated Design Features (IDFs) would ensure that adequate cover and other erosion prevention measures are in place. Sedimentation risk would be limited to the first spring runoff following implementation. With the implementation of Best Management Practices (BMPs) and IDFs, as listed in the Hydrology and Soils Report (project record), Alternative 1 should have no detectable adverse effect on water quality, and exposed soils would be protected. Water quality in Pine Creek would also improve over the long term by relocating watering holes away from streams, improving livestock distribution. This would reduce chronic sediment, nutrient, and pathogen sources that result from concentrated grazing in riparian areas. Slightly reducing road density by ripping and recontouring non-system, previously decommissioned routes and railroad grades would remove additional non-point sediment sources.

The proposed restoration actions would improve channel morphology and bank stability at project sites. Removal of in-channel waterholes and re-location of water sources would disperse livestock away from channels to allow for vegetative recovery and reduce trampling, thereby improving bank stability. Floodplain function would improve through the recontouring of old roads and railroad grades with elevated beds that impede meandering and constrict flows.

Alternative 1 proposes the establishment of a new borrow pit for an economical and local source of fill material for restoration projects. This action would remove up to 2.5 acres of productive soil for an extended period of time. This loss of acreage is more than offset by the decommissioning of 2.2 miles (approximately 7 acres) of unauthorized routes and abandoned railroad grades and would result in a long-term net gain in soil productivity. The borrow pit would be located on a sagebrush flat away from stream channels and outside of riparian conservation areas, and BMPs would be in place to ensure adequate protection of streams and riparian areas.

There would be local long-term beneficial effects to hydrologic and soils resources with regard to improved soil moisture, improved long-term ground cover, reduced stream flow diversions, and enhanced riparian meadows in portions of Burgess Meadow and Pine Creek Valley by blocking borrow ditches and the splitter structure on the mainstem of Pine Creek.

Cumulative Effects

The boundary used to determine cumulative effects was the Bogard Flat 7th field subwatershed. This alternative would treat a very small percentage of the subwatershed (less than 1pecent). The project area encompasses both the Bogard Flat and Burgess subwatersheds, but because of the limited proposed activity taking place in the Burgess subwatershed (3.3 acres total), the cumulative effects analysis area for both alternatives is constrained to Bogard Flat, where the majority of actions would take place.

Cumulative effects are the direct and indirect effects that result from the proposed action or alternatives when added to other past, ongoing, and reasonable foreseeable future actions in the project subwatershed. Other previous activities include grazing, several past watershed improvement activities, limited timber harvest, road and railroad construction. The actions proposed under this alternative are very small relative to the subwatershed. Thus, the cumulative watershed effects resulting from those activities would be negligible. However, the proposed restoration activities would trend watershed conditions toward improved hydrologic functions, including more natural flow paths, increased connectivity, better water quality, and meadow function.

Alternative 2

Direct and Indirect Effects

Under this alternative, only ongoing and foreseeable future management activities would take place within the subwatersheds, including grazing at waterhole sites. There would be no watershed improvements implemented under this alternative, thus there would be no ground disturbing activities in Riparian Conservation Areas (RCAs) or the associated risk of short-term sedimentation. There would be no long-term beneficial effects to hydrologic or soils resources associated with the watershed improvements and route decommissioning. There would be no long term improvement in soil moisture or cover in riparian areas. Areas identified in need of watershed improvement would continue to concentrate or impede hydrologic flow patterns.

Cumulative Effects

There would be no beneficial cumulative effects from meadow enhancements, water impoundment removal, or road decommissions that would help improve hydrologic functions through restoration, better infiltration, and decreased runoff and sedimentation from roads. Negative cumulative effects from concentrated grazing in streamside riparian areas would continue, including chronic sedimentation and bank instability. Railroad grades and road beds that constrict Pine Creek and divert flows into borrow ditches would remain on the landscape, as would non-system routes that contribute to road density and sediment sources. There would be no facilitated trends toward improving hydrologic flow paths, connectivity, or meadow functions to trend the subwatershed towards improved water and soil quality.

Air Quality

Alternative 1

Direct, Indirect and Cumulative Effects

Burning the slash from tree removal sites has the potential to impact air quality. In accordance with Title 17 of the California Code of Regulations, a smoke management plan would be required and would be submitted and approved by the Lassen County Air Pollution Control District (LCAPCD) prior to any prescribed fire ignitions that are part of Alternative 1. Adherence to the smoke management plan (SMP) for pile burning would decrease the chance of negative impacts to communities and other smoke sensitive

areas. It would also help to ensure that emissions from pile burning would not violate the National Ambient Air Quality (NAAQ) emission standards. Burning only occurs when atmospheric conditions are conducive to good smoke dispersion and that the cumulative effects of all prescribed burning remain at levels that are within the provisions of the Clean Air Act. Fugitive dust from operations would be mitigated by standard contract requirements for road watering or other dust abatement techniques.

Alternative 2

Direct, Indirect and Cumulative Effects

Alternative 2 would create no short-term impacts from smoke to the local areas because pile burning would not be needed.

Management Indicator Species (MIS), Terrestrial and Aquatic

The Pacific tree frog is the only MIS whose habitat would be either directly or indirectly affected by the Pine Creek Restoration Project.

The Pacific tree frog (now known as the Pacific chorus frog) was selected as an MIS for wet meadow habitat in the Sierra Nevada. Analysis for this species focuses on four habitat factors that affect wet meadows: (1) Acres of wet meadow habitat, (2) Acres with changes in California Wildlife Habitat Relationships (CWHR) herbaceous height classes, (3) Acres with changes in CWHR herbaceous ground cover classes and (4) Changes in meadow hydrology.

Alternative 1

Direct, Indirect and Cumulative Effects

There would be no change to CWHR height class on the approximately 950 acres of wet meadow in the Pine Creek Restoration Project. For Alternative 1, there are negligible short-term reductions in cover class on approximately 10 acres from project activities with a possible long term improvement of cover class in up to 1.5 acres. Contouring of waterholes and abandoned railroad grades could add approximately .6 acres of wet-meadow, offset by up to .25 acres loss on marginal wet meadows. There are potential long term benefits in hydrology to approximately 148 acres of wet meadows from road, railroad and waterhole recontouring and decommissioning. Considering the approximately 61,000 acres of wet meadow on USFS lands and small changes to habitat factors on limited acres, Alternative 1 would not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Pacific tree frogs across the Sierra Nevada bioregion.

Alternative 2

Direct, Indirect and Cumulative Effects

Due to a lack of direct effects to habitat factors of analysis for the MIS habitats and species analyzed for this project, Alternative 2 would continue long-term trends within the project area, and would not alter the

existing trend in the analyzed habitats nor would it lead to a change in the distribution across the Sierra Nevada bioregion for Pacific tree frog.

Threatened, Endangered, and Sensitive (TES) Wildlife Species, Terrestrial and Aquatic

Alternative 1

Due to the project area being outside the range of the species, or due to the lack of suitable habitat or habitat components in the project area, it is was determined the action alternatives would have no effect on the following Federally Listed threatened or endangered species or their critical habitat: gray wolf, northern spotted owl, valley elderberry beetle, Central Valley steelhead DPS, Central Valley chinook salmon ESU, Delta smelt, winter-run chinook salmon ESU, California red-legged frog, Shasta crayfish, conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and giant garter snake.

Due to the project area being outside the range of the species, or due to the lack of suitable habitat or habitat components in the project area, it was determined that Alternative 1 would have no effect on the following Forest Service Sensitive species: Northern bald eagle, California wolverine, American marten, Pacific fisher, Sierra Nevada red fox, Townsend's big-eared bat, pallid bat, fringed myotis, great gray owl, willow flycatcher, greater sandhill crane, yellow rail, northern goshawk, California spotted owl, Shasta hesperian snail, western bumblebee, foothill yellow-legged frog, Sierra Nevada yellow-legged frog, Cascade frog, northwestern pond turtle, California floater, Great Basin rams-horn, scalloped juga, topaz juga, montane peaclam, nugget pebblesnail, black juga, kneecap lanx, Goose Lake redband trout, hardhead, and Pacific lamprey. Sensitive species analyzed in detail for the Pine Creek was Eagle Lake rainbow trout. A summary of the analysis of effects of the project for this species is given below:

Direct, Indirect and Cumulative Effects - Eagle Lake Rainbow Trout

Pine Creek provides primarily migration habitat necessary for ELRT. The potential direct effects to ELRT are negligible due to implementation of project integrated design features. Small long-term benefits to ELRT migratory habitat are expected from Alternative 1.

Increased sediment production reaching Pine Creek is low with the implementation of project integrated design features (which include BMPs) within the RCAs, the flat topography of Pine Creek in the area, and the small area treated within the Pine Creek watershed compared to subwatershed size. The potential sedimentation risk from this project would not increase the cumulative risk from sedimentation to Pine Creek. There is also a low chance of long-term benefits to the sediment balance in Pine Creek as a result of railroad road and waterhole recontouring. This potential project effect is expected to contribute to the decreased cumulative risk from sedimentation to Pine Creek in the long term. There is a moderately-low chance for increased habitat connectivity as a result of this project. Both the recontouring of transportation routes and the barrier reinforcements are designed to allow Pine Creek to more naturally flow though Pine Creek Valley. These actions could alleviate pinch points for flow which could decrease

bottlenecks for fish passage under higher flow conditions. When combined with past restoration projects alternative one would contribute to the overall increased habitat connectivity.

Determination: Implementation of Alternative 1 may affect individuals of Eagle Lake rainbow trout, but were not likely to result in a trend towards federal listing or loss of species viability.

Alternative 2

Direct, Indirect and Cumulative Effects

Current trends would continue under Alternative 2. No projects would be implemented and habitat improvements would not occur and Eagle Lake rainbow trout would not benefit from this alternative.

Analyses of direct, indirect, and cumulative effects indicated that Alternative 2 of the Pine Creek Restoration Project would have no effect on Eagle Lake rainbow trout.

Range

Alternative 1

Direct

Due to the small acreage of the proposed action in relation to the large areas encompassed by the three allotments in which activities would occur under Alternative 1, implementation of the proposed action would have no direct effects to the rangeland resource or livestock management.

Indirect

There would be indirect effects of implementing the proposed action to both the rangeland resource and livestock management. Removal of the man-made barriers to the natural flow patterns of Pine Creek would improve species composition and condition of riparian and meadow vegetation and improve soil moisture retention. Removal of in-stream dug-out waterholes and construction of replacement water sources would encourage more grazing of upland vegetation away from riparian areas, making better use of the rangeland resource overall and distributing livestock across more of the rangeland.

Cumulative Effects

Long-term cumulative effects would be the benefit from the naturally functioning flows of Pine Creek, including better hydrologic condition of the creek system, improved riparian vegetation adjacent to the stream channels as well as associated meadow vegetation, and better distribution of livestock grazing throughout the riparian and meadow areas as well as the upland rangelands.

Alternative 2

Direct, Indirect and Cumulative Effects

There would be no direct, indirect or cumulative effects to the rangeland resource by the No Action alternative. Livestock operations would continue as described in the respective environmental documents and current Term Grazing Permits.

The implementation of Alternative 2 would not change current conditions of the rangeland resource or livestock management. There would be the lost opportunity to begin riparian and watershed improvements that could have long-term benefits to the watershed, riparian and rangeland conditions associated with Pine Creek Valley.

Silviculture

Silviculture resources in the context of this report refer to the coniferous tree component on the landscape. Because of the limited extent in which silviculture resources are affected, this analysis does not examine the social and economic environments.

Alternative 1

Direct Effects

Direct effects are limited to the removal of trees in and around restoration sites. All but two sites have scattered non-merchantable incidental trees would also be removed from existing borrow pit sites, Railroad 2, and access roads. The material from these trees would be lopped and scattered. Bogard Barn road and the Crater borrow pit have the highest density of trees. Trees occurring on the elevated road bed on the Bogard Barn Road and the Crater borrow pit would be removed, bole, stump and roots and piled in designated locations. In total 77 trees would be removed from the Bogard Barn Road with 39 trees over 10" dbh. 463 trees would be removed from the Crater borrow pit location with 142 trees over 10" dbh. Tree removal does include trees as great as 24" DBH. Some resulting root wads may be utilized as a source of fill in the recontouring activities.

Indirect Effects

Proposed treatments could enhance silviculture resource values indirectly. The combined activities of recontouring railroads, roads, and waterholes would improve soil moisture availability that would indirectly have a positive effect on tree growth and vigor on adjacent forested lands.

Cumulative Effects

The cumulative effects analysis boundary for silviculture resources is within the scope of the treatment areas since the existing vegetative conditions in these areas are the result of past management activities of railroad, road, and borrow ditch construction in and around wetlands, stream corridors, lakes, seeps, springs, and wet meadows. These disturbances in the project areas led to the currently existing conifer component. The cumulative effects analysis for silviculture resources considers impacts of the alternatives when combined with the past, present, and foreseeable future actions and events. A temporal scope was also selected in determining cumulative effects, because impacts to the currently existing silviculture resources in these areas can accumulate over time from different activities or events.

The proposed action would benefit the silviculture resource by reversing the negative impact from past practices. The proposed watershed improvement activities would restore ecosystem functions and services on the landscape, including adjacent forested lands.

Alternative 2

Direct and Indirect Effects

No adverse or beneficial effects from project related activities would occur to silviculture resources as a result of implementing this alternative. Under the No Action alternative, actions related to silviculture resources within the Pine Creek Restoration Project that would restore ecosystem functions and services on the landscape, including adjacent forested lands, would not occur.

Cumulative Effects

Without management intervention, there is concern that damage created from past construction projects could continue to degrade the watersheds and the associated ecosystems. The conifers would continue to establish and grow, worsening the impact on the watershed.

Threatened, Endangered, and Sensitive (TES) Plant Species

Alternative 1

There are currently three occurrences of the TES species *Astragalus pulsiferae* var. *suksdorfii* known from the Pine Creek project area. Occurrence #1A is a substantial area between Railroad 2 and the southern foot of Crater Mt., and #1B is a small patch on the south side of Road 32N07, about 500 yards east of #1A. Occurrence #14A is three patches of plants south of Railroad 2 and Waterhole 2—the two closest patches are about 300 yards from the waterhole. (Occurrence #1 is north of Pine Creek, and Occurrence #14 is south of Pine Creek.) Occurrence #16 is in two patches between 100 and 350 yards south of Waterhole 1.

Also occurring within the area are three plant species listed as noxious weeds by the California Department of Food and Agriculture (CDFA). Diffuse knapweed *(Centaurea diffusa)* is a CDFA A-listed species with high priority for treatment, and dyer's woad *(Isatis tinctoria)* and perennial pepperweed *(Lepidium latifolium)* are both B-listed species with moderate priority for treatment. See the Pine Creek project Noxious Weed Risk Assessment for detailed information on weed locations and implications of the project for noxious weed risk.

Direct Effects

Direct effects involve physical damage to plants or their habitat, including the crushing, breaking, or removal of individual plants and the disturbance or compaction of the soil around plants. Such damage can not only kill plants but remove their capacity to contribute to the resident seed bank. Implementation of the Pine Creek project may have some effects on *Astragalus pulsiferae* var. *suksdorfii* Occurrence #1A, near Railroad 2. The portion of the railroad grade to be removed lies southeast of the occurrence and so

would have no effect on the plants, but the movement of equipment to the grade removal area (as well as Waterhole 2 just beyond it) and the decommissioning of three nearby unauthorized routes may kill or damage some plants. Occurrence #1B lies near one of these routes but on the opposite side of Road 32N07; therefore, it is unlikely to be affected. However, considerable portions of the other two routes to be decommissioned intersect Occurrence #1A. The occurrence is flagged, and Integrated Design Features for the project call for avoidance of the occurrence to the extent practicable and for no staging, parking, blading, or filling to occur within the occurrence. Damage to *Astragalus pulsiferae* plants, if any, should therefore be very limited. Moreover, the occurrence is large both in area (about 12 acres) and plant numbers, and the prime habitat is in the open flat away from the routes. Part of Occurrence #14A also lies near Railroad 2/Waterhole 2, but is well south of Pine Creek and out of reach of direct effects from project activities.

Direct effects may also occur to Occurrence #16, which is located a short way south of Waterhole 1. As with Occurrence #1A, the waterhole work itself will have no effect on the *Astragalus pulsiferae* occurrence, but access to the waterhole will be through or very near part of the occurrence. Access will simply involve tracked equipment driving to and from the waterhole that is to be recontoured. The occurrence will be flagged for avoidance. If there are undiscovered outlier plants, they may be damaged by passage of the tracked equipment, but effects, if any, should be minimal and incidental.

Additional suitable habitat for *Astragalus pulsiferae* var. *suksdorfii* probably exists in the vicinity of proposed work areas for the Pine Creek project. There is considerable likelihood that more occurrences will be found in Pine Creek Valley at large, but all of the Pine Creek project areas were intensively surveyed and no additional *A. pulsiferae* occurrences were found.

In summary, any direct effects on *Astragalus pulsiferae* var. *suksdorfii* with implementation of the Pine Creek project would be minimal and well within the management guidelines, which permit disturbance to 50 percent of plants in occurrences greater than one acre.

Indirect Effects

There may be indirect effects to all three occurrences of *Astragalus pulsiferae* var. *suksdorfii* from the Pine Creek project. Indirect effects primarily relate to changes in a species' habitat, such as changes in vegetation structure or an increased risk of noxious weed invasion. Indirect effects can be beneficial, neutral, or harmful.

The recontouring of railroad grades and waterholes under the Pine Creek project is intended to better retain high water flows and distribute water and sediments across the valley floor more naturally. The restoration of more natural water and sedimentation regimes in the valley may alter hydrologic conditions within *A. pulsiferae* habitat at all three of the occurrences in the project area. The occurrence locations, however, are outside of the valley's central drainage corridor. The occurrences likely pre-existed roads, railroads, and waterholes, and the species is probably well adapted to the naturally fluctuating hydrologic conditions in the valley. Changes in the structure of *A. pulsiferae* habitat are more likely to result from the decommissioning of unauthorized routes. If anything, soil conditions in the beds of these routes would

likely show less compaction after project implementation and would gradually approach the soil condition of adjacent habitats, therefore offering more habitat for *A. pulsiferae* to occupy.

Another indirect effect of the proposed action is a potential increase in noxious weeds or other undesirable non-native species as a result of project activities. At this time there are no known occurrences of noxious weeds that are near known *Astragalus pulsiferae* occurrences within the Pine Creek project area. Along Highway 44, there are occurrences of *Centaurea diffusa* (diffuse knapweed) and *Isatis tinctoria* (dyer's woad) between the Bogard Barn area and Waterhole #1. However, weeds have not been seen along this part of the highway since 2006, and the occurrences are likely extirpated. The Pine Creek Noxious Weed Risk Assessment completed for this project determined an overall low to moderate risk of potential weed spread with the implementation of the proposed action. The standard practices of equipment cleaning and other Integrated Design Features greatly reduce the potential for project-related noxious weed spread. As there are no occurrences near *Astragalus pulsiferae* var. *suksdorfii* in the project area, the risk of noxious weed impacts to the species is low.

Cumulative Effects

The project area was chosen as the cumulative effects analysis area for *Astragalus pulsiferae* var. *suksdorfii* because the historical range and specific habitat requirements are unknown for this species, and it is assumed that if the Pine Creek project would not affect the viability of the species within the project area, it would not affect the viability outside of the project area.

Vegetation management, livestock grazing, and road maintenance are activities that could affect *Astragalus pulsiferae* var. *suksdorfii* in the project area and add cumulatively to the effects of the project itself. Vegetation management projects on the Eagle Lake Ranger District have been surveyed to similar standards as the Pine Creek Restoration project, and known occurrences of Sensitive plant species for which viability was a concern have either been avoided by project activities or protected by Integrated Design Features that minimized impacts. Livestock grazing within the Upper Pine Creek Allotment could affect individuals of *Astragalus pulsiferae* var. *suksdorfii*, but substantial livestock usage has not been reported at the *A. pulsiferae* sites, except perhaps where Occurrence #1A straddles Road 32N07. Due to the small stature of the plants and the sparse vegetative cover in their dry habitat, cattle likely do not graze them much or spend much time in their habitat. Road maintenance activities could also have some effects on occurrences that, like Occurrence #1A in the Pine Creek project, approach or straddle roadways. The core of Occurrence #1A is well away from the road it straddles; that said, the fact that *A. pulsiferae* can be found in old landings, skid trails, and system roads speaks to its preference for low-competition, open habitats and its capability to withstand a moderate amount of disturbance. Woodcutting and hunting or other recreational activities may affect *A. pulsiferae* plants by trampling but only to a very limited and incidental degree.

There are therefore few impacts that would add cumulatively to impacts from the proposed action. Occurrence #16 has by estimate only about 180 plants, but they are well scattered and the site is remote and unforested —appreciable impacts here from the proposed action or other activities are unlikely. The

situation at Occurrences #14A is very similar. Occurrence #1A is perhaps more vulnerable, but it covers a large area and supports many thousands of individual plants. Furthermore, *A. pulsiferae* var. *suksdorfii* has been known to colonize disturbed soils at landings and along skid trails and to resprout from subsurface root crowns following low-intensity burns. Overall, any effects from the implementation of the proposed action, including cumulative effects, would be well within the current management guidelines for this species, which specify that 50 percent of any occurrence larger than one acre may be disturbed by project activities.

Determination: Implementation of the Proposed Action may have some effects on three occurrences of *Astragalus pulsiferae* var. *suksdorfii* in upper Pine Creek Valley. Movement of heavy vehicles to project area sites and along Forest Service roads may harm some individual *A. pulsiferae* plants, but the effects would be very limited and incidental. The decommissioning of unauthorized routes in one of the occurrences may also harm some plants but would ultimately create added or improved habitat for the species. Therefore, it was determined that the implementation of the Proposed Action of the Pine Creek Restoration Project may affect some individuals or habitat of *Astragalus pulsiferae* var. *suksdorfii* but would not likely result in a trend toward federal listing of the species as Threatened or Endangered or in a loss of viability for the species.

Alternative 2

Direct Effects

There would be no direct effects on *Astragalus pulsiferae* var. *suksdorfii* from the No Action alternative other than those associated with current ongoing actions.

Indirect Effects

Indirect effects of the No Action alternative on *Astragalus pulsiferae* var. *suksdorfii* would be those associated with potential livestock travel to the waterholes near the three *A. pulsiferae var. suksdorfii* occurrences, if the waterholes continue to exist and attract concentrated use by cattle. Cattle passing through the occurrences could trample some plants or even graze a few, but little or no usage of the occurrences by cattle has been observed. Therefore, the No Action alternative would be less favorable for *Astragalus pulsiferae* than the Proposed Action, but the difference is likely to be only minor.

Cumulative Effects

Cumulative effects from past, ongoing, and foreseeable future actions would be the same as those addressed under Alternative 1.

Cultural Resources

Alternative 1

Direct Effects

Ground-disturbing activities associated with this alternative have the potential to disturb or destroy cultural resources. Proposed treatments such as road/railroad grade recontouring, filling of borrow ditches, decommissioning of unauthorized routes via ripping and or recontouring, filling and recontouring dugout waterholes and borrow pits, may damage or destroy historic and prehistoric archaeological sites. Increased traffic, use, and maintenance of roads could possibly affect cultural resources that are bisected by roads.

Standard Resource Protection Measures (SRPM) as defined in the Regional Programmatic Agreement and Interim Protocol would be employed as integrated design features and applied to all cultural resources within the area of potential effects (APE).

Out of the seven identified properties within the Pine Creek Restoration Project Area boundary, two historic properties are directly within proposed treatment areas; some sites are located in more than one treatment area. One site is located in an area proposed for recontouring of a railroad grade, filling of borrow ditches, filling and recontouring of a waterhole and placement of a new waterhole.

The railroad grades in Pine Creek Valley were associated with the Red River Lumber Company and Fruit Growers Supply Company. The railroad grades were determined not eligible for inclusion on the National Register of Historic Places (SHPO 1998). Thus the railroad grades are no longer managed and protected from project activities. The borrow ditches associated with the railroad grades are also no longer managed nor protected from project activities. The waterhole was placed in recent times and does not contribute to the historic integrity of the site. The placement of new waterhole has the potential to have an adverse impact to the site.

In order to avoid adverse impacts to the site, all work should be primarily contained to the railroad grades, borrow ditches, waterhole, and identified access routes. If heavy machinery is needed to implement restoration treatments through the site, access may be granted by an archaeologist through areas free of cultural resources and if ground disturbance is kept to a minimum. Eliminating railroad grades could also reduce the probability of off-highway vehicle (OHV) travel on them and consequently through the site. The removal of the waterhole could be beneficial to the site since cattle would no longer walk through the site to access it. Fewer cattle on the site would decrease the potential for trampling, cattle trails and wallowing. Before the location for a new waterhole is finalized, it must be first approved that it is located outside of a historic property and in an area that would not attract or at the least minimize cattle through a site.

A second site is bisected by a road proposed for recontouring and returning to grade. In order to avoid any adverse impacts to the site, no recontouring will take place in the section of the road that bisects the site. Recontouring the road leading up to the site could have a beneficial impact to the site in the long run.

While the road is currently not a forest system road, it can still potentially be accessed by off highway vehicles. Recontouring the road will decrease the probability of OHV impacts to the site.

Four sites are located within 100 meters of waterholes proposed for filling and recontouring. Even though the waterholes are not located in the sites, the sites could potentially be adversely impacted if equipment is driven though the site. The equipment must travel around the site or stay on Forest Systems roads to reach the waterholes. Eliminating the waterholes would have a beneficial impact to the site since cattle would no longer go through the site to access the waterhole.

One site is located just outside of an area proposed for road recontouring and filling of borrow ditches. The equipment must travel around the site or stay on Forest Systems roads to reach the road and borrow ditches to avoid adverse equipment impact to the site.

Determination: Provided integrated design features are employed for archaeological sites and features, there would be no adverse effects to cultural resources resulting from proposed treatments within the project area.

Indirect Effects

Some of the treatments could enhance cultural resource values, even if they do not directly affect the landscape within the site boundary. Removal of waterholes in areas of historic logging camps and other associated historic logging features could enhance the historic character of the resource by restoring its original landscape context. Proposed treatments adjacent to prehistoric sites would enhance cultural resource values and the prehistoric context of these resources.

Cumulative Effects

The cumulative effects analysis boundary for cultural resources is the treatment areas with a 100 meter buffer around them. The geographic scope of the cumulative effects analysis boundary was selected because impacts to cultural resources accumulate at the specific location of cultural resources, irrespective of actions in surrounding areas. Archaeological sites are stationary resources, which are protected from all project (current or future) related activities until eligibility to the National Register of Historic Places has been determined. Generally, archaeological sites are not influenced by actions taken outside their boundary since this is addressed and mitigated during project planning and integrated design features. A temporal scope was also selected in determining cumulative effects, because impacts to cultural resources at a given location can accumulate over time from different activities or events.

The cumulative effects analysis for cultural resources considers impacts of the alternatives when combined with the past, present, and foreseeable future actions and events prior to the 1974 Forest and Rangeland Renewable Resources Planning Act and the archaeological protection laws of the mid 1970s, effects to cultural resources were not considered during project planning or implementation. Consequently, cumulative impacts of varying degrees occurred within the project area from various land management activities including primarily logging, road construction, and grazing. Natural environmental processes and unrestricted land uses have also contributed to effects to cultural resources within the Pine

Creek Restoration Project Area. These include: dispersed recreation, OHV uses, user created roads and trails, wildfires, erosion, and exposure to the elements.

Activities associated with this alternative would comply with the National Historic Preservation Act (NHPA) of 1966, as amended and implementing regulations 36 CFR 800. Tribal communities would continue to be consulted for any concerns regarding this project. Protection of cultural resources would also comply with the Regional Programmatic Agreement as referenced above. SRPM as outlined in the Regional PA would be followed throughout the duration of project activities. Provided that SRPMs are applied, all project impacts would avoid historic properties. Following such protective measures, no adverse effects to the known sites are anticipated.

Determination: The proposed action would reduce the risk of impacts to cultural resources by reducing the risk of impacts by cattle and OHV use on the sites. The alternative should, therefore, have an overall beneficial effect to cultural resources.

Alternative 2

Direct and Indirect Effects

No adverse effects from project related activities would occur to cultural resource sites as a result of implementing this alternative. The risk of potential damage from cattle or OHV use on fragile cultural resources is greater should the "No Action" alternative be selected due to roads, borrow pits and waterholes staying in place. Effects to known cultural resources could potentially occur from cattle and OHV use. Under the "No Action" alternative, cultural resources within the Pine Creek Restoration Project Area would most likely suffer from neglect and natural deterioration resulting in potential loss of valuable data. This option would not provide opportunities for study and interpretation.

Cumulative Effects

Without management intervention there is a concern that damage from cattle and OHV use could occur. Cultural resources within the Pine Creek Restoration Project Area have features, structures, artifacts that could be damaged or destroyed by cattle or OHV use. The effects of cattle on the sites could result in trampling, wallowing, and destroying individual artifacts and partial or complete destruction of features. The effects of OHV use could result in user created roads on the site and lead to destroying individual artifacts and partial or complete destruction of features.

Transportation

Alternative 1

Direct Effects

The goal of transportation management is to provide a safe and efficient transportation system. There are no direct effects to the system from this action as all roads proposed for decommissioning are not considered part of the system. In the short term there would be a direct effect of increasing traffic due to

the movement of equipment, materials and personnel into and out of the project area. Increasing traffic can impact the safety of the public and employees using the roads in the area. Traffic management measures would minimize these impacts. With the use of standard safety provisions for traffic control, effects would be negligible.

Indirect Effects

Indirectly, progress would be made in effectively managing the Forest Transportation System. There would be a decision on unauthorized routes that exist within the project area that are currently prohibited from wheeled motor-vehicle use.

Cumulative Effects

Cumulatively, road density would be reduced with the decommissioning of the unauthorized routes. Recontouring these roads would eliminate their adverse impact on the landscape

Alternative 2

Direct, Indirect and Cumulative Effects

Under this Alternative, no treatments would be performed and the existing road system within the project area would remain as is. There would be no direct or cumulative effects. Unauthorized routes within the analysis area would remain on the landscape.

Recreation and Visual Resources

Alternative 1

Direct, Indirect and Cumulative Effects

With the implementation of the standard safety procedures, there would be minimal effects (direct, indirect, or cumulative) to recreation or public safety under Alternative 1. Actions proposed would result in minimal effects (direct, indirect, or cumulative) to the visual resources, Including of the positive effect from the restoration of a more natural landscape.

Alternative 2

Direct, Indirect and Cumulative Effects

As no action would occur, there would be no effects (direct, indirect, or cumulative) to recreation or public safety. There would be no effects (direct, indirect, or cumulative) to the visual resources.